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"LIDAR" Versus "lidar" Versus "LiDAR" Versus "LADAR"

A Google Tool Chronicles the Shifting Acronym Landscape

At what point did the phrase, "**L**ight (or **L**aser) **D**etection **A**nd **R**anging" gain four acceptable versions of case or spelling? A look at Google's Ngram Viewer provides some insight on popular shifts that, so far, have kept users of the term from adopting a single, commonly accepted spelling and case.

The Ngram Viewer is a computational linguistics and probability model that attempts to predict the next item in a sequence—examples include a word, syllable, or phrase in a sentence. It charts, year by year, the twists and turns of cultural and professional trending vernacular within published literature.

For instance, the Ngram Viewer shows that the word "Watergate" was a rare term in published literature between 1800 and 1971. Then came the Watergate scandal, and in a mere five years—1972 through 1977—uses of "Watergate" in published literature multiplied nearly **tenfold** over all references in the previous 171 years.

The Ngram Viewer also is used to search various spellings of the same word, such as U.S.A. or USA—and in this case, it's clear that "USA" experienced a sharp rise in use between 1970 and 2000.

The Google database that informs the Ngram Viewer is massive, featuring millions of scanned hard-copy and online documents. The inclusion of textbooks and fiction along with digital publications allows insight into trends in culture as well as technologies.

However, it's important to note that the Ngram database records go only as far as 2008, with Google busily trying to catch up by scanning literature from 2009 to 2014. So the Ngram Viewer's latest chapter on the most popular acronym for "**L**ight (or **L**aser) **D**etection **A**nd **R**anging" is currently being forged.

The historical use of the term "radar,"—lidar's acronym cousin—has taken a very different path from "lidar." Eighty years ago, the uppercase "RADAR" rose quickly as a popular and important technology through routine use.

Then in 1939, the lowercase "radar" was coined by the U.S. military, leading

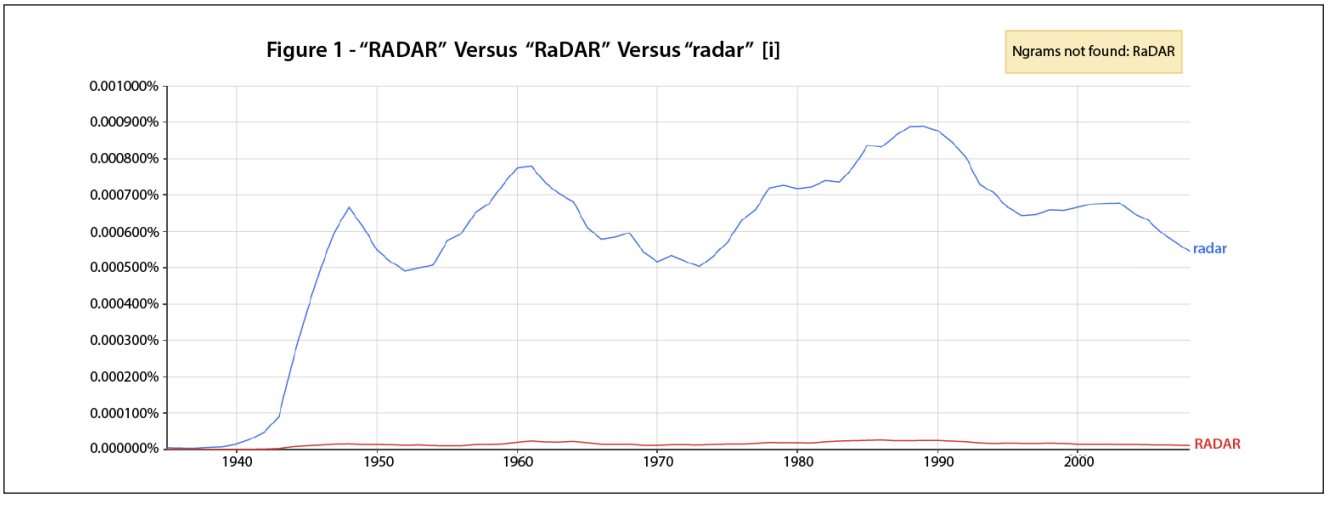

Figure 1: "RADAR" versus "RaDAR" versus "radar"[1]

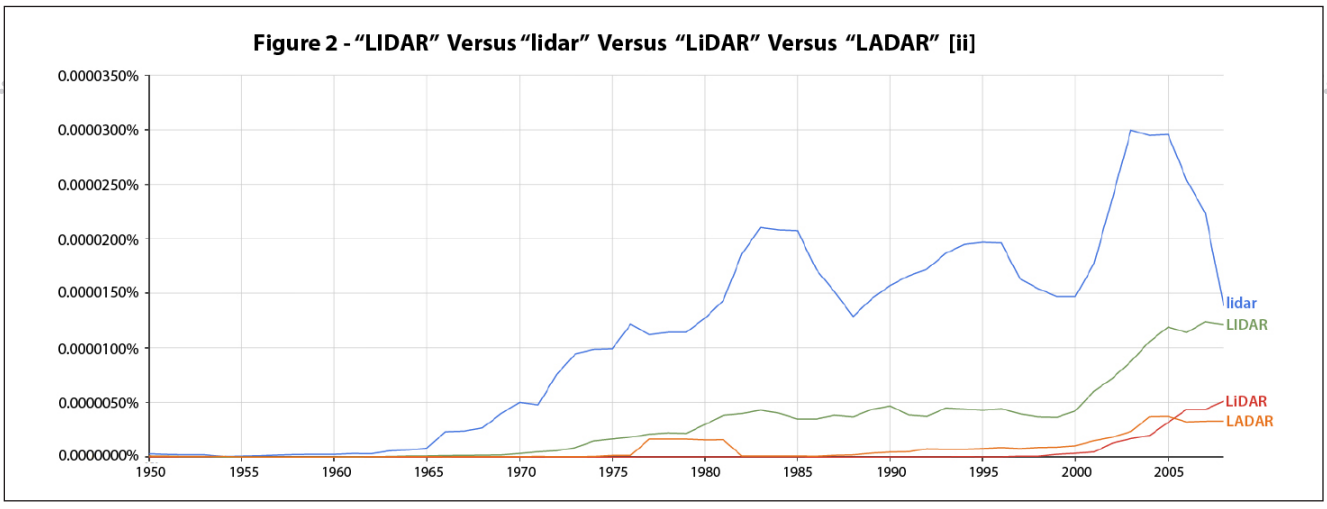

Figure 2: "LIDAR" versus "lidar" versus "LiDAR" versus "LADAR"[2]

the entire industry to begin using it as the legitimate, standard term. The same quick transition from uppercase to lowercase happened with the terms "SCUBA," "LASER," and military "CARE" packages.

Common origins should lead to common types of spelling—but that process is not happening with "LIDAR." The chronological chart shown above provides insight on the popular trends that are keeping this acronym from making the same quick transition to a standardized, all-lowercase use.

Early on, "lidar" shows a clear lead in terms of popularity, with "LIDAR" a distant second. The mixed-case version—"LiDAR"—shows up intermittently between 1979 and 1990, getting a sudden bump in use around 1999. Finally, there's "LADAR"—which stands for **LA**ser **D**etection **A**nd **R**anging—the most obscure version of all and used primarily by some of Europe's defense and commercial industries.

It seems clear that the industry-wide jumbling of cases and spellings surged as interest in lidar technology took off at the beginning of the 21st Century. For example, a look at the years 2005 through 2008 (the latest Ngram measurements available) show several fluctuations. Although lowercase "lidar" is not old news just yet, its usage fell dramatically during these three years. In addition, the all-uppercase version dipped slightly while the mixed-case version definitely gained ground.

We can only speculate about the thinking behind this shifting landscape. Does "LiDAR" look stronger, smarter, new age, superior to its lowercase cousin? Do "lidar" and "LIDAR" represent the past while "LiDAR" represents the future?

Final Thoughts

Although the NGram Viewer is a useful tool, it's worth noting that it measures word usage in only one way, valuing popularity above the industry's technical style guidelines or standard dictionary definitions and spellings.

As a case in point, one of the industry's respected technical guides—the 2007 second edition of the *Digital Elevation Model Technologies and Applications: The DEM User's Manual*—clearly prefers the all-lowercase tradition established by "radar," "scuba," and other terms, noting, "Like radar and sonar, lidar is now commonly written in lower case." This manual uses the lower case "lidar" exclusively throughout.[3]

It's also important to note that Google has not yet released Ngram findings from 2009 through 2014. (For that reason, trending technologies such as "iPad" have no Ngrams yet.) When more current results come out, we might see even greater fluctuations in the term or we may see a frontrunner begin to take hold.

As this technology continues to become more prevalent and less expensive, our community would be wise to work toward a single, standard use, whether it is "LIDAR," "LiDAR," or "lidar." Anything less will continue to cause needless distractions in this rapidly growing field.

References

[1] Figure 1 – "'RADAR' Versus 'RaDAR' Versus 'radar' (1930-2008, English)" http://bit.ly/1me14Ju

[2] Figure 2 – "'LIDAR' Versus 'lidar' Versus 'LiDAR' Versus 'LADAR' (1950-2008, English)'" http://bit.ly/1uP6Ppa

[3] Maune, David F. *Digital Elevation Model Technologies and Applications, The DEM User's Manual, 2nd edition.* Bethesda, Maryland. American Society for Photogrammetry and Remote Sensing, 2007.

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